AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (original) A method of controlling commutation of an electric motor, comprising:

using a stator having a plurality of spaced apart field windings that define a plurality of magnetic neutral zones therebetween;

disposing an armature coaxially relative to said stator and forming said armature with a plurality of radially extending posts defining a plurality of winding slots therebetween;

segmenting a first coil into first and second series coupled coil portions that are wound in first and second offset slot pairs such that a magnetic axis of said first coil is advanced, relative to a given one of said field coils, and with respect to a direction of rotation of said armature;

segmenting a second coil into first and second series coupled coil portions that are wound in said third and fourth slot pairs that are offset by at least one slot position from said first and second slot pairs, respectively, such that a magnetic axis of said second coil is retarded, relative to said given one of said field coils, and with respect to said direction of rotation of said armature; and

electrically exciting said first and second coils such that each of said coils at least substantially completes commutation within ones of said magnetic neutral zones.

2. (original) The method of claim 1, further comprising:

segmenting a third coil into first and second series coupled subcoil portions; and

winding said subcoil portions of said third coil into said third and fourth slot pairs such that no offsetting of said third coil occurs relative to said second coil.

3. (original) A method for controlling commutation of a two coil-per-slot electric motor, comprising:

forming a stator having a plurality of spaced apart field coils defining a plurality of magnetic neutral zones;

forming an armature having a plurality of radially extending posts defining a plurality of winding slots therebetween;

segmenting a first coil into first and second subcoil portions;

winding said first subcoil portion in a first pair of said slots;

winding said second subcoil portion in a second pair of said slots that are offset by at least one slot position from said first pair of slots;

said subcoil portions of said first coil defining a magnetic axis that is advanced relative to a given one of said field coils, and with respect to a direction of rotation of said armature;

segmenting a second coil into first and second series coupled subcoil portions;

winding said first subcoil portion of said second coil in a third pair of slots that are offset from said first pair of slots;

winding said second subcoil portion of said second coil in a fourth pair of slots that are offset from said second pair of slots;

said subcoil portions of said second coil defining a magnetic axis that is retarded relative to said given one of said field coils, and with respect to said direction of rotation of said armature; and

electrically exciting said coils such that each at least substantially completes commutation within different ones of said magnetic neutral zones.

4. (original) The method of claim 3, further comprising: segmenting a third coil in first and second series coupled subcoil portions; and

winding said subcoil portions of said third coil into said third and fourth pairs of slots with said subcoil portions of said second coil such that complete overlapping of said second and third coils is achieved and a magnetic axis of said third coil coincides with said magnetic axis of said second coil.

5. (original) The method of claim 4, further comprising: segmenting a fourth coil in first and second series coupled subcoil portions;

winding said subcoil portions of said fourth coil into fifth and six pairs of said slots that are offset by at least one slot position from said third and fourth pairs of said slots, respectively.

6. (currently amended) A method of reducing at least one of brush arcing and electromagnetic interference in an electric motor, comprising:

using a stator having a plurality of spaced apart field ~~windings~~ coils that define a plurality of ~~magnetic neutral~~ commutation zones therebetween;

disposing an armature coaxially relative to said stator ~~and forming said armature with a plurality of radially extending posts defining a plurality of winding slots therebetween~~;

segmenting a first coil into first and second series coupled coil portions that are wound on said armature in first and second offset slot pairs of said armature such that a magnetic axis of said first coil is advanced, relative to a given one of said field coils, and with respect to a direction of rotation of said armature;

segmenting a second coil into first and second series coupled coil portions that are wound in ~~said~~ third and fourth slot pairs of said armature that are offset by at least one slot position from said first and second slot pairs, respectively, such that a magnetic axis of said second coil is retarded, relative to said given one of said field coils, and with respect to said direction of rotation of said armature; and

electrically exciting said first and second coils, each of said first and second coils such that each completes commutation within ~~certain ones~~ one of said ~~magnetic neutral~~ commutation zones.

7. (withdrawn) A method for reducing electromagnetic interference (EMI) in a rotating electric machine, comprising:

forming a stator having a plurality of spaced apart field poles, said field coils defining a plurality of commutation zones between each adjacent pair of field poles;

forming an armature;

winding a plurality of coils on said armature using a two-coil-per-slot winding convention; and

further winding said coils on said armature such that each said coil is positioned, as each said coil is electrically excited, to at least substantially complete commutation within one of said commutation zones.

8. (withdrawn) The method of claim 7, wherein said commutation zones each form magnetic neutral zones relative to said field coils.

9. (withdrawn) The method of claim 7, wherein each said coil is segmented into two series coupled subcoil portions.

10. (withdrawn) The method of claim 9, wherein said subcoil portions of first and second ones of said coils are wound so as to be offset by one slot position from one other, and such that partial overlapping of said subcoils of said first and second coils occurs.

11. (withdrawn) A method for reducing at least one of brush arcing and electromagnetic interference (EMI) in an electric motor having a stator with a plurality of field coils, wherein each adjacent pair of field coils defines a magnetic neutral zone therebetween, the method comprising:

forming an armature having a plurality of coils wound thereon in accordance with a two coil-per-slot winding pattern;

disposing the armature coaxially relative to the stator;

further arranging said coils on said armature to cause each said coil to be positioned so as to be able to begin, and substantially complete, commutation within one of said magnetic neutral zones as said armature rotates.

PLEASE ADD THE FOLLOWING NEW CLAIMS

12. (New) The method of claim 6, wherein segmenting said first coil into first and second series coupled coil portions comprises segmenting said first and second coil portions into subcoils having differing numbers of winding turns.

13. (New) The method of claim 6, wherein segmenting said second coil into first and second series coupled coil portions comprises segmenting said first and second coil portions of said second coil into subcoils having differing numbers of winding turns.

14. (New) The method of claim 6, further comprising a third coil having first and second coil portions that are wound in the slots as said first and second coil portions of said second coil.

15. (New) A method of reducing at least one of brush arcing and electromagnetic interference in an electric motor, comprising:

using a plurality of spaced apart field coils to define a plurality of spaced apart commutation zones;

winding a first coil having first and second series coupled subcoils onto an armature, said first and second subcoils being wound in slot pairs on said armature that are offset from one another, and such that a magnetic axis of said first coil is advanced, relative to a given one of said commutation zones, and with respect to a direction of rotation of said armature;

winding a second coil having first and second series coupled subcoils onto said armature such that said subcoils of said second coil are offset by one slot position from said subcoils of said first coil, and further such that said second coil has a magnetic axis that is retarded, relative to said given one of said commutation zones and with respect to said direction of rotation of said armature; and

electrically energizing said first and second coils so that each at least substantially completes commutation within said given commutation zone.

16. (New) The method of claim 15, further comprising forming said first coil such that said first and second subcoils of said first coil have different numbers of winding turns.

17. (New) The method of claim 15, further comprising forming said second coil such that said first and second subcoils of said second coil have different numbers of winding turns.

18. (New) The method of claim 15, further comprising winding a third coil having first and second series coupled subcoils onto said armature in the same winding slots as said subcoils of said second coil.